IN THE CLAIMS

Please enter the below claim amendments. The below listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently amended) A method of equalizing output signals from ~~a plurality of signal paths~~ one or more microphones, ~~each signal path having a microphone,~~ the method comprising the steps of:

~~(a) applying predictable noise to each signal path to generate an output noise;~~

applying a first predictable noise to a converter having a known transfer function to convert the first predicable noise to an audio output based on the transfer function of the converter, and applying the audio output to the microphone without adaptively modifying the audio output to convert the audio output to a first output noise;

applying a second predictable noise to a compensation filter for compensating for the known transfer function of the converter, the first and second predictable noises being synchronized in time by a synchronizer, the compensation filter outputting a second output noise based on the compensation;

~~(b)~~ explicitly identifying a transfer function of ~~each signal path~~ the microphone based on the corresponding first and second output noises;

~~(c)~~ based on a single selected function for the one or more microphones, determining a filtering function for ~~each signal path~~ the microphone such that the product of the transfer function and the filtering function is the single selected function; and

~~(d)~~ applying the filtering function for ~~each signal path~~ the microphone to ~~the corresponding transfer function~~ an equalization filter for the microphone ~~to generate the selected function~~ such that ~~the output signals from the signal paths are substantially equal with respect to phase or phase and magnitude~~ a transfer function between the microphone and the equalization filter for the microphone is substantially equal to the single selected function.

2. (Currently amended) A method according to claim 1, wherein the single selected function is the transfer function of one of the microphones ~~for one of the signal paths~~.

3. (Currently amended) A method according to claim 1, wherein the single selected function is a common factor, and wherein the filtering function is determined such that the product of the transfer function of the microphone and the filtering function is the common factor.

4. (Currently amended) A method according to claim 1, wherein the step of applying the filtering function comprises ~~steps~~ a step of:

~~(a) providing a filter to each signal path; and~~

~~(b) applying~~ loading the filtering function ~~for each signal path~~ to the ~~corresponding~~ equalization filter.

5. (Currently amended) A method according to claim 1, wherein:

the step of applying a first predictable noise comprises~~, for each signal path, steps~~ a step of:

~~(a)~~ providing a first predictable noise sample signal ~~to the signal path to produce the output noise~~ to the converter, the converter converting the first predicable noise sample signal to the audio noise output~~; and~~,

the step of applying a second predictable noise comprises a step of:

~~(b)~~ providing a second predictable noise sample signal to the compensation filter, the second predictable noise sample signal having a property substantially identical to the first predictable noise sample signal and being substantially identical to the first predictable noise sample signal on a sample-by-sample basis, the first and second predictable noise sample signals being synchronized in time by the synchronizer, the compensating filter compensating the second predictable noise sample signal for the transfer function of the converter and outputting the second output noise based on the compensation.

~~the step of identifying a transfer function comprises, for each signal path, a step of:~~

~~(c) processing the output noise and the second predictable noise sample signal to identify the transfer function of its corresponding signal path~~.

6. (Cancelled)

7. (Currently amended) A method according to claim 1, wherein:

the step of applying a first predictable noise comprises a step of:

applying a first predictable noise signal to the converter, the converter converting the first predicable noise signal to a first predictable noise sample,

the step of applying ~~a predictable noise~~ the audio output comprises~~, for each signal path, steps~~ a step of:

~~(a)~~ acoustically providing [[a]] the first predictable noise sample to the microphone with a propagation time delay ~~to generate the output noise; and~~, the microphone converting the first predictable noise sample with the propagation time delay to the first output noise,

the step of applying a second predictable noise comprises a step of:

~~(b)~~ providing ~~a noise signal corresponding to the first predictable noise sample with the propagation time delay~~ applying a second predictable noise signal to the compensation filter, the first and second predictable noise signals being synchronized in time by the synchronizer, the compensation filter compensating the second predictable noise signal for the transfer function of the converter and outputting the second output noise based on the compensation.

~~the step of identifying a transfer function comprises, for each signal path, a step of:~~

~~(c) processing the output noise and the noise signal to identify the transfer function of its corresponding signal path.~~

8. (Currently amended) A method according to claim 7, wherein the first predictable noise signal is a first predictable digital noise signal, and the second predictable noise signal is a second predictable digital noise signal, and wherein:

the step of ~~providing~~ applying a first predictable noise ~~sample~~ comprises ~~steps~~ a step of:

~~(a)~~ generating [[a]] the first predictable digital noise signal, and

~~(b) converting the first predictable digital noise signal into the first predictable noise sample;~~

the step of ~~providing~~ applying a second predictable noise ~~signal~~ comprises ~~steps~~ a step of:

~~(c)~~ generating [[a]] the second predictable digital noise signal ~~sample, and~~

~~(d) converting the second predictable digital noise signal into the noise signal~~.

9. (Currently amended) A method according to claim [[8]] 7, wherein:

the step of ~~converting the second predictable digital noise signal~~ identifying comprises steps of:

~~(a) synchronizing the second predictable digital noise signal with the first predictable digital noise signal;~~

~~(b)~~ delaying ~~the second predictable digital noise signal~~ the second output noise by same

amount of time as the propagation delay time; and

~~(c) compensating the second predictable digital noise signal for the conversion factor of the first predictable digital noise signal~~

processing the first output noise and the delayed second output noise to estimate the transfer function of the microphone.

10. (Cancelled) ~~A method according to claim 1, wherein for each signal path, the transfer function of the signal path is a transfer function of the microphone.~~

11. (Previously presented) A method according to claim 7, wherein the propagation delay time is selected to be integer multiple of the first predictable noise sample.

12. (Currently amended) A method according to claim 8, wherein the step of generating [[a]] the first predictable digital noise signal includes a step of utilizing a maximum length sequence generator to generate the first predictable digital noise signal.

13. (Currently amended) A method according to claim 8, wherein the step of generating [[a]] the second predictable digital noise signal includes a step of utilizing a maximum length sequence generator to generate the second predictable digital noise signal that is substantially identical to the first predictable digital noise signal on a sample-by-sample basis.

14. (Previously presented) A method according to claim 8, wherein each of the first predictable digital noise signal and the second predictable digital noise signal comprises a white noise signal.

15. (Previously presented) A method according to claim 8, wherein each of the first predictable digital noise signal and the second predictable digital noise signal comprises a random noise signal.

16. (Currently amended) An apparatus for equalizing output signals from ~~a plurality of signal paths~~ one or more microphones, ~~each signal path having a microphone,~~ the apparatus comprising:

~~(a)~~ a module for applying a first predictable noise to ~~each signal path to generate an output noise~~ a converter having a known transfer function, the converter converting a first predicable noise to an audio output based on the transfer function of the converter,

a module for applying the audio output to the microphone without adaptively modifying the audio output, the microphone converting the audio output to a first output noise; ~~and~~

a module for applying a second predictable noise to a compensation filter for

compensating for the transfer function of the converter, the second predictable noise being synchronized with the first predictable noise by a synchronizer, the compensation filter outputting a second output noise based on the compensation;

~~(b)~~ a module for explicitly identifying a transfer function of ~~each signal path~~ the microphone based on the corresponding first and second output noises;

~~(c)~~ a module for determining~~, based on a single selected function,~~ a filtering function for ~~each signal path~~ the microphone based on a single selected function for the one or more microphones such that the product of the transfer function of the microphone and the filtering function is the single selected function; and

~~(d)~~ a module for applying the filtering function for ~~each signal path~~ the microphone to ~~the corresponding transfer function~~ an equalization filter for the microphone ~~to generate the selected function such that the output signals from the signal paths are substantially equal with respect to phase or magnitude and phase~~ such that a transfer function between the microphone and the equalization filter for the microphone is substantially equal to the single selected function.

17. (Currently amended) An apparatus according to claim 16, wherein the single selected function is the transfer function of one of the microphones ~~for one of the signal paths~~.

18. (Currently amended) An apparatus according to claim 16, wherein the single selected function is a common factor, and wherein the filtering function is determined such that the product of the transfer function of the microphone and the filtering function is the common factor.

19. (Currently amended) An apparatus according to claim 16, wherein the module for applying the filtering function comprises:

~~(a) a filter provided to each signal path ; and~~

(b) a module for loading the filtering function ~~for each signal path~~ to the ~~corresponding~~ equalization filter.

20. (Currently amended) An apparatus according to claim 16, wherein:

the module for applying a first predictable noise comprises~~, for each signal path~~:

~~(a)~~ a noise generator for ~~providing~~ generating a first predictable noise sample signal ~~to the signal path to produce the output noise~~, and ~~providing~~ generating a second predictable noise sample signal, the second predictable noise sample signal having a property substantially identical to the first predictable

noise sample signal and being substantially identical to the first predictable noise sample signal on a sample-by-sample basis, the converter converting the first predicable noise sample signal to the audio noise output, the first and second predictable noise sample signals being synchronized in time by the synchronizer, the compensation filter compensating the second predictable noise sample signal for the transfer function of the converter and outputting the second output noise based on the compensation

~~the identifying module comprises, for each signal path:~~

~~(b) a module for processing the output noise and the second predictable noise sample signal to identify the transfer function of its corresponding signal path~~.

21. (Currently amended) An apparatus according to claim 20, wherein the microphone is capable of converting a sound signal to an electrical analog signal, and ~~each signal path further includes~~ wherein the apparatus comprises an analog-to-digital converter coupled to the microphone for converting the electrical analog signal into a digital signal.

22. (Currently amended) An apparatus according to claim 16, ~~wherein the microphone is capable of converting a sound signal to an electrical analog signal, and each signal path, further includes an analog-to-digital converter coupled to the microphone for converting the electrical analog signal into a digital signal,~~ wherein:

the module for applying a first predictable noise comprises:

a module for applying a first predictable noise signal to the converter, the converter converting the first predicable noise signal to a first predictable noise sample based on the transfer function of the converter,

the module for applying ~~a predictable noise~~ the audio output comprises~~, for each signal path~~:

~~(a)~~ a module for acoustically providing [[a]] the first predictable noise sample to the microphone with a propagation time delay ~~to produce the output noise; and~~, the microphone converting the first predictable noise sample with the propagation time delay to the first output noise,

the module for applying a second predictable noise comprises:

~~(b)~~a module for providing ~~a noise signal corresponding to the first~~

~~predictable noise sample with the propagation time delay~~ a second predictable noise signal to the compensation filter, the first and second predictable noise signals being synchronized in time by the synchronizer, the compensation filter compensating the second predictable noise signal for the transfer function of the converter and outputting the second output noise based on the compensation.

~~the module for identifying a filtering function comprises, for each signal path:~~

~~(c)a module for processing the output noise and the noise signal to identify the transfer function of its corresponding signal path~~.

23. (Currently amended) An apparatus according to claim 22, wherein the first predictable noise signal is a first predictable digital noise signal, and the second predictable noise signal is a second predictable digital noise signal, and wherein the apparatus comprises:

~~the module for providing a first predictable noise sample comprises:~~

~~(a)~~ a ~~first~~ noise generator for generating [[a]] the first predictable digital noise signal and the second predictable digital noise signal ~~and~~,

~~(b) a first converter for converting the first predictable digital noise signal into the first predictable noise sample~~,

~~the module for providing a noise signal comprises:~~

~~(c) a module for providing; and~~

~~(d)a second converter for converting the second predictable digital noise signal into the noise signal~~.

24. (Currently amended) An apparatus according to claim [[23]] 22, wherein ~~the second converter comprises~~ the module for identifying comprises:

~~(a) a synthesizer for synthesizing the second predictable digital noise signal with the first predictable digital noise signal;~~

~~(b)~~a module for delaying ~~the second predictable digital noise signal~~ the second output noise by same amount of time as the propagation delay time; and

~~(c) a module for compensating the second predictable digital noise signal for the conversion factor of the first predictable digital noise signal~~

a module for processing the first output noise and the delayed second output noise to estimate the transfer function of the microphone.

25. (Currently amended) An apparatus according to claim 23, wherein the ~~first~~ noise generator includes a maximum length sequence generator for generating the first predictable digital noise signal that is substantially identical to the second predictable digital noise signal on a sample-by-sample basis.

26. (Currently amended) An apparatus according to claim [[23]] 16, wherein the ~~first~~ converter includes:

~~a digital to analog converter for converting the first predictable digital noise signal into an analog noise signal, and~~ a loud speaker ~~for providing the analog noise signal to the microphone~~.

27. (Previously presented) An apparatus according to claim 23, wherein the first predictable digital noise signal is a first maximum length sequence noise, the second predictable digital noise signal being a second maximum length sequence noise that is substantially identical to the first maximum length sequence noise on a sample-by-sample basis.

28. (Cancelled) ~~An apparatus according to claim 21, wherein for each signal path, the transfer function of the signal path is a transfer function of the microphone~~.

29. (Previously presented) An apparatus according to claim 22, wherein the propagation delay time is selected to be integer multiple of the first predictable noise sample.

30. (Currently amended) An apparatus according to claim 23, wherein each of the first predictable digital noise signal and the second predictable digital noise signal comprises a white noise signal.

31. (Currently amended) An apparatus according to claim 23, wherein each of the first predictable digital noise signal and the second predictable digital noise signal comprises a random noise signal.

32. (Currently amended) An apparatus according to claim 23, wherein the ~~first~~ noise generator includes a maximum length sequence generator[[,]] for generating the first predictable digital noise signal and the second predictable digital noise signal ~~being generated by the maximum length sequence generator~~.

33. (Currently amended) A method for a listening device comprising ~~a plurality of signal paths~~ one or more microphones for transmitting sound signals to a user, ~~each signal path having a microphone,~~ outputs from the ~~signal paths~~ one or more microphones being equalized using the method according to claim 1.

34. (Currently amended) A method for a hearing aid comprising ~~a plurality of signal paths~~ one or more microphones for transmitting sound signals to a user, ~~each signal path having a microphone,~~ outputs from the ~~signal paths~~ one or more microphones being equalized using the method according to claim 1.

35. (Currently amended) A method for a headset comprising ~~a plurality of signal paths~~ one or more microphones for transmitting sound signals to a user, ~~each signal path having a microphone,~~ outputs from the ~~signal paths~~ one or more microphones being equalized using the method according to claim 1.

36. (Currently amended) A listening device comprising:

~~a plurality of signal paths~~ one or more microphones for transmitting sound signals to a user, ~~each signal path having a microphone,~~ outputs from the ~~signal paths~~ one or more microphones being equalized by the apparatus according to claim 16.

37. (Currently amended) A hearing aid comprising:

~~a plurality of signal paths~~ one or more microphones for transmitting sound signals to a user, ~~each signal path having a microphone,~~ outputs from the ~~signal paths~~ one or more microphones being equalized by the apparatus according to claim 16.

38. (Currently amended) A headset comprising:

~~a plurality of signal paths~~ one or more microphones for transmitting sound signals to a user, ~~each signal path having a microphone,~~ outputs from the ~~signal paths~~ one or more microphones being equalized by the apparatus according to claim 16.

39. (Currently amended) A listening device according to claim 36, comprising:

a signal equalization filter provided for each ~~signal path~~ of one or more microphones, wherein the function of the signal equalization filter is determined by the apparatus according to claim 16 and is loaded to the signal equalization filter.

40. (Currently amended) A hearing aid according to claim 37, comprising:

a signal equalization filter provided for each ~~signal path~~ of one or more microphones, wherein the function of the signal equalization filter is determined by the apparatus according to claim 16 and is loaded to the signal equalization filter.

41. (Currently amended) A headset according to claim 38, comprising:

a signal equalization filter provided for each ~~signal path~~ of one or more microphones, wherein the function of the signal equalization filter is determined by the apparatus according to

claim 16 and is loaded to the signal equalization filter.

42. (Currently amended) A method of providing sound signals to a user through a system including ~~a plurality of signal paths~~ one or more microphones, ~~each signal path having a microphone,~~ the method comprising steps of:

preparing a filtering function for ~~each signal path,~~ each of one or more microphones, including, for each of the one or more microphones, the steps of:

~~(a) applying a predictable noise to each signal path to generate an output noise,~~

applying a first predictable noise to a converter having a known transfer function, the converter converting the first predicable noise to an audio output based on the transfer function of the converter;

applying the audio output to the microphone without adaptively modifying the audio output, the microphone converting the audio output to a first output noise; and

applying a second predictable noise to a compensation filter for compensating for the transfer function of the converter, the first and second predictable noises being synchronized in time by a synchronizer, the compensation filter outputting a second output noise based on the compensation,

~~(b)~~ explicitly identifying a transfer function of ~~each signal path~~ the microphone based on the corresponding first and second output noises; and

~~(c)~~ determining~~, based on a single selected function,~~ the filtering function for ~~each signal path~~ the microphone based on a single selected function for the one or more than microphones such that the product of the transfer function of the microphone and the filtering function is the single selected function, and

~~operating the system, including the steps of:~~

~~(d)~~ applying the filtering function for ~~each signal path~~ the microphone to ~~the corresponding transfer function~~ an equalization filter for the microphone ~~to generate the selected function~~ such that a transfer function between the microphone and the equalization filter for the microphone is substantially equal to the single selected function, ~~and~~

operating the system, including the step of:

~~(e) providing the sound signals to the signal paths, whereby the sound signals output from the signal paths are substantially equal with respect to phase or phase and magnitude~~ for each of the one or more microphones, transferring a sound signal through the microphone and the equalization filter for the microphone.

43. (Currently amended) A sound system for one or more microphones for transmitting sound signals, comprising:

~~a system for providing sound signals to a user, including:~~

~~(a) a plurality of signal paths for transmitting the sound signals to the user, each signal path including a microphone; and~~

~~(b) a filters provided to each signal path,~~

~~an equalizing module, including:~~

~~(c) a circuit for applying a predictable noise to each signal path to generate an output noise;~~

a converter having a known transfer function;

a module for applying a first predictable noise to the converter, the converter converting the first predicable noise to an audio output based on the transfer function of the converter;

a module for applying the audio output to the microphone without adaptively modifying the audio output the microphone converting the audio output to a first output noise;

a compensation filter for compensating for the transfer function of the converter;

a module for applying a second predictable noise to the compensation filter, including a synchronizer for synchronizing the first and second predictable noises in time, the compensation filter outputting a second output noise based on the compensation;

~~(d)~~ an identification circuit for explicitly identifying a transfer function of ~~each signal path~~ the microphone based on the corresponding first and second output noises; and

~~(e)~~ a determination circuit for determining~~, based on a single selected function,~~ a

filtering function for ~~each signal path~~ the microphone based on a single selected function for the one or more microphones such that the product of the transfer function of the microphone and the filtering function is the single selected function,

~~when the signal paths transfer the sound signals to the user,~~ the filtering function being applied to ~~the corresponding~~ an equalization filter for the microphone ~~to generate the selected function, whereby the sound signals from the sound providing system are substantially equal with respect to phase or phase and magnitude~~ such that a transfer function between the microphone and the equalization for the microphone is substantially equal to the single selected function.

44. (Currently amended) A sound system according to claim 43, wherein the single selected function is the transfer function of one of the microphones ~~for one of the signal paths~~.

45. (Currently amended) A sound system according to claim 43, wherein the single selected function is a common factor, and wherein the filtering function is determined such that the product of the transfer function of the microphone and the filtering function is the common factor.

46. (Currently amended) A sound system according to claim 43, wherein:

the ~~circuit~~ module for applying ~~a predictable noise~~ the audio output comprises~~, for each signal path~~:

(a) a module for providing a first predictable noise signal to the microphone through the converter to ~~produce~~ convert the first predictable noise signal to the first output noise[[; and]],

the module for applying a second predictable noise comprises:

(b) a module for providing a second predictable noise signal to the compensation filter, the second predictable noise signal having a property substantially identical to the first predictable noise signal and being substantially identical to the first predictable noise signal on a sample-by-sample basis[[,]].

~~the identifying circuit comprises, for each signal path:~~

~~(c) a module for processing the output signal and the second predictable noise signal.~~

47. (Previously presented) A sound system according to claim 46, wherein the module for providing a first predictable noise signal includes a maximum length sequence generator for generating the first predictable noise signal.

48. (Previously presented) A sound system according to claim 47, wherein the maximum length sequence generator generates the second predictable noise signal.

49. (Previously presented) An apparatus according to claim 16, wherein the module for identifying a transfer function performs an Auto Regressive Moving Average (ARMA) to estimate the transfer function.

50. (Previously presented) A sound system according to claim 43, wherein the identifying circuit performs an Auto Regressive Moving Average (ARMA) to estimate the transfer function.

51. (New) A method according to claim 1, wherein the one or more microphones comprises at least a first microphone and a second microphone, and wherein an output signal through the first microphone and the equalization filter for the first microphone is substantially equal to an output signal through the second microphone and the equalization filter for the second microphone with respect to phase or phase and magnitude.

52. (New) An apparatus according to claim 16, wherein the one or more microphones comprises at least a first microphone and a second microphone, and wherein an output signal through the first microphone and the equalization filter for the first microphone is substantially equal to an output signal through the second microphone and the equalization filter for the second microphone with respect to phase or phase and magnitude.

53. (New) A method according to claim 42, wherein the one or more microphones comprises at least a first microphone and a second microphone, and wherein an output signal through the first microphone and the equalization filter for the first microphone is substantially equal to an output signal through the second microphone and the equalization filter for the second microphone with respect to phase or phase and magnitude.

54. (New) A system according to claim 43, wherein the one or more microphones comprises at least a first microphone and a second microphone, and wherein an output signal through the first microphone and the equalization filter for the first microphone is substantially equal to an output signal through the second microphone and the equalization filter for the second microphone with respect to phase or phase and magnitude.